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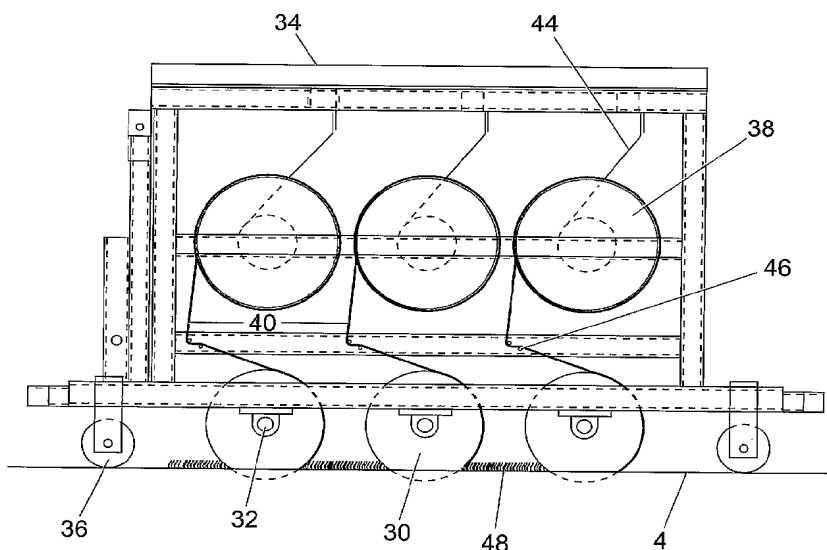
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- (71) Applicant (for all designated States except US): **PITCH-LINE LIMITED** [GB/GB]; 24a Francis Street, Lurgan, Armagh BT66 6DN (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): **DOUGLAS, Barry** [GB/GB]; 24a Francis Street, Lurgan, Armagh BT66 6DN (GB).
- (74) Agent: **MURGITROYD & COMPANY**; 165-169 Scotland Street, Glasgow G5 8PL (GB).
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(54) Title: METHOD OF MAKING A LINE



(57) Abstract: A method of forming a line on a ground surface is described. It comprises the steps of: forming one or more slits in the ground surface; inserting a line of material in the or each slit such that part of the material is visible above the ground surface. Also described is a material suitable for use in forming a line on a ground surface. The ground surface is generally grassed earth, and the material can be a geotextile such as polypropylene. The present invention provides a simple but effective means of providing marked lines e.g. for playing surfaces such as football, rugby pitches and the like. The lines will remain, and need no further repair or maintenance for a number of years, while still providing the same visual effect as painted line.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

1 Method of Making a Line

2

3 The present invention relates to a method of making
4 lines on ground surfaces suitable for playing fields
5 and the like, and apparatus and material therefor.

6

7 In the island of Ireland, there are approximately
8 120,000 playing pitches for soccer, gaelic football,
9 cricket and the like. The lines for such pitches are
10 generally formed by a wheeled paint buggy, which
11 introduces a line of paint on the ground through the
12 travel of the front wheel through a paint reservoir.

13

14 However, heavily used pitches often require newly
15 painted lines every week during a playing season,
16 whereas these lines are often 'lost' in the non-
17 playing season as the surrounding grass encroaches,
18 and the pitches are not so regularly mowed. Weed or
19 grass killer can be added to the intended line, but
20 because grass is on either side of each line, the
21 grass and weeds still encroach quickly. It will be
22 appreciated the amount of time taken by groundsmen

1 to keep clearing and repainting pitch lines for
2 120,000 pitches in Ireland alone.

3
4 It is an object of the present invention to provide
5 more permanent lines in the ground.

6
7 Thus, according to one aspect of the present
8 invention, there is provided a method of forming a
9 line on a ground surface comprising the steps of:
10 forming one or more slits in the ground surface;
11 inserting a line of material in the or each slit
12 such that part of the material is visible above the
13 ground surface.

14
15 The slit in the ground surface could be formed by
16 any suitable means, one such being a blade,
17 preferably cylindrical, and preferably having a
18 sharpened or tapered edge to assist entry into and
19 through the ground surface.

20
21 The ground surface can be any surface on which a
22 slit can be formed, one such being earth, more
23 generally grassed earth.

24
25 In one embodiment of the present invention, the
26 method comprises forming between two and four slits,
27 preferably three slits, parallel in the ground, so
28 as to create a broader form of 'marked' line. Where
29 the method involves forming multiple lines, the
30 lines can be any suitable distance apart. Where it
31 is intended generally to provide a single visible
32 marked line in the ground surface, the multiple

1 slits are preferably relatively close, generally
2 within 10-40mm, and such as 20mm, inter-distant.

3

4 The or each slit created preferably creates little
5 or no visible disturbance on the ground surface
6 other than the marked line. Preferably, the ground
7 surface is rolled after the insertion of the or each
8 line of material.

9

10 The material may be any suitable material, at least
11 part of which is visible above the ground surface.

12 The material may be any suitable colour, white being
13 the commonest colour for many playing pitches. More
14 than one colour could also be used, in any design or
15 pattern.

16

17 Preferably, at least that part of the material
18 visible above the ground surface is partially or at
19 least substantially resistant to sunlight, in
20 particular UV light. In this regard, the material
21 may inherently have a high kilo-langley strength, or
22 be treated so as to have such a high strength.

23

24 In another embodiment of the present invention, the
25 material is at least partly open or has an open
26 structure, through which the ground under the ground
27 surface, or anything growing in the ground under the
28 ground surface, such as the roots of grass, etc, can
29 extend so as to help anchor the material in the slit
30 either immediately and/or over time.

31

1 According to another embodiment of the present
2 invention, the material is a polymer material such
3 as polypropylene. Such material is widely
4 available.

5
6 One range of polypropylene textile fibre materials
7 are geotextiles. Such materials have moisture
8 resistance so that water has no effect on tensile
9 strength or mechanical properties, extensive
10 chemical resistance, leachate compatibility,
11 biological resistance as polypropylene does not
12 support fungal growth, temperature stability,
13 ultraviolet resistance (preferably by the addition
14 of carbon black or other UV inhibitors), and
15 superior puncture and Mullen burst strength (which
16 make them resistant to installation stresses). One
17 supplier of such materials is Don and Low Limited,
18 Forfar, Scotland.

19
20 The material is preferably inserted in the slit by
21 travel on the slit-forming means. More preferably,
22 the material travels on the edge of the slit-forming
23 means towards and into the surface, and is located
24 in the slit as the slit is being formed.

25
26 More preferably, at least a portion of the material
27 which is not inserted into the ground surface
28 comprises a number of separate or discrete fibres,
29 or fibre-like extensions. These together provide
30 the visual form of the line, but are wholly or
31 substantially individual like blades of grass. More
32 preferably, that portion of the material above the

1 ground surface is not damageable by a lawnmower or
2 ground trimmer or the like.

3
4 The material could also include a herbicide, such as
5 a weedkiller or the like, which preferably leaches
6 from the material over time, and helps keep the area
7 in and around the ground surface relatively clear.
8 This includes grass.

9
10 According to one embodiment of the present
11 invention, the material comprises a woven plastics
12 material, having a central woven portion which is
13 insertable in the ground surface, and extended weft
14 fibres adapted to partially or substantially
15 extended above the ground surface.

16
17 Thus, according to one embodiment of the present
18 invention, there is provided a method of forming a
19 line on a ground surface comprising the steps of:
20 locating a slit-forming means having at least one
21 blade on the ground surface, such that a portion of
22 the blade enters the ground surface;
23 locating a fibrous or woven material on each blade;
24 traversing the slit forming means along the path of
25 the intended line;
26 allowing the material to travel with each blade into
27 the ground;
28 leaving the material in each slit formed such that
29 part of the material is visible above the ground
30 surface.

31

1 According to a further embodiment of the present
2 invention, the line formed by the present invention
3 is 'permanent', i.e. remains to form a line for at
4 least a number of years, expectantly greater than
5 ten years.

6
7 The height of the material above the ground can be
8 any suitable height, possibly based on expectation
9 of use. For example, 30-35mm height is generally
10 suitable for many football pitches. Also, some
11 ground surfaces are not flat, and the height of the
12 visible material may be such as to be able to
13 accommodate variation in the level of the surface.

14
15 In a second aspect, the present invention extends to
16 a line on a ground surface formed by the method
17 and/or material as hereinbefore described.

18
19 The method, and line thereby formed, may be straight
20 or arcuate or any combination. The path of the line
21 may follow guide means on the surface, or other
22 markings.

23
24 When a straight line is desired, a direction means
25 may be used, such a light beam, for example a laser
26 beam. The beam could be directed along the intended
27 path of the line, and that path then followed.

28
29 Thus, according to another embodiment of the present
30 invention, the method further includes the step of
31 following a light beam along the path of the
32 intended line.

1

2 According to a third aspect of the present
3 invention, there is provided a line-forming
4 apparatus, which apparatus comprises one or more
5 rotatable blades, each blade being adapted to form a
6 slit in the ground surface, and adapted to feed
7 around its edge a material for partially inserting
8 into the slit.

9

10 Preferably the apparatus includes a roller following
11 the or each blade, more preferably two or more
12 rollers on which the apparatus traverses along the
13 ground surface.

14

15 The apparatus could also include a line-direction
16 means, or line-direction means receptor, such as a
17 laser beam, or a laser beam screen. The user of the
18 apparatus then follows the path of the beam to
19 create a straight line.

20

21 According to a fourth aspect of the present
22 invention, there is provided use of a material as
23 hereinbefore defined to make a line on a ground
24 surface.

25

26 The material could be made from any material
27 including plastics. Preferably the material is a
28 polyolefin such as polypropylene or a co-polymer,
29 more preferably a geotextile.

30

31 According to a fifth aspect of the present
32 invention, there is provided a vented fabric

1 material suitable for use in forming a line on a
2 ground surface.

3

4 Preferably, the vented fabric material comprises
5 warp and weft fibres, having a core section or solid
6 centre line, and free weft fibres or tapes on each
7 side. The free weft fibres are designed to be that
8 part of the fabric material that partially or
9 substantially extends above the ground surface.

10

11 The material is preferably a woven plain material,
12 more preferably a non-fibrolated tape. Typical but
13 not-limiting qualities include 97 and 47 warp and
14 weft ends per 10cm, 125g/m² density, and 50 tex
15 striped warp, and 220 tex white UV weft fibres.

16

17 The vented fabric material could be formed from a
18 fully woven material, from which warp fibres are
19 removed from each side to provide 'free' portions of
20 the weft fibres.

21

22 Alternatively, and according to another aspect of
23 the present invention, there is provided a process
24 for forming a vented fabric material as herein
25 before described, wherein lines of weft material are
26 run, and intermittent lines of warp fibres are run
27 thereinbetween, so as to form portions of woven
28 material and portions of weft fibre material only.

29

30 Such a material can then be cut across each weft
31 fibre portion, to create a vented fabric material

1 having a woven core portion, and free weft fibres on
2 each side.

3

4 Preferably, there is a catch thread included which
5 holds the warp threads in place.

6

7 The process provides periodic weaving, or non-
8 weaving, periods.

9

10 Embodiments of the present invention will now be
11 described by way of example only, and with reference
12 to the accompanying drawings in which:

13

14 Figure 1 shows marked lines in a grassy earth
15 surface according to one embodiment of the present
16 invention;

17 Figures 2a and 2b are diagrammatic cross-sections of
18 the ground in Figure 1 along Arrows A & B
19 respectively;

20 Figure 3 is a side view of apparatus according to
21 another embodiment of the present invention;

22 Figure 4 is an enlarged part view of part of the
23 apparatus in Figure 3 in use;

24 Figure 5 is a plan view of the apparatus in Figure
25 3.

26 Figure 6 is a schematic plan view of a vented fabric
27 method of production according to another embodiment
28 of the present invention; and

29 Figure 7 is a section of vented fabric prepared from
30 the process of Figure 6.

31

1 Referring to the drawings, Figure 1 shows marked
2 lines 2 in a grassy earth-surface 4 as an
3 illustration of the effect of the present invention.
4 The marked lines could be used as pitch lines for
5 the corner of a soccer or gaelic football pitch.

6
7 Figure 2a shows a cross-sectional view through the
8 ground 4 across the path of the marked line 2 in
9 Figure 1, showing the location of three lines of
10 white material 6 in the ground surface 4. Figure 2b
11 shows a longitudinal cross-section of the marked
12 line 2 of Figure 1 along Arrow B. These figures
13 show the material 6 having a woven section 10 which
14 is within the ground surface 4, and the free fibres
15 12 extending therefrom, the ends of which 19 are
16 visible above the ground surface 4.

17
18 That part of the material above the ground surface 4
19 is labelled in Figures 2a and 2b as 20, and that
20 part which is below the ground surface 4 is labelled
21 22.

22
23 In Figure 2a, figurative grass 8 is shown each side
24 of the line 2, although the relative heights of the
25 grass 8 and the parts of the material above the
26 ground surface 20 are for illustrative purposes
27 only.

28
29 It is expected that the grass 8 will re-grow around
30 the visible part 20 of the material. However,
31 material such as polypropylene is not cuttable by
32 most if not all types of lawnmowers, especially

1 those lawnmowers used generally to mow playing
2 surfaces. Thus, it is not a problem if the grass
3 grows in amongst the visible material 20 creating
4 the marked white lines, as mowing of the surface
5 will reduce it to the same or a lower height than
6 the visible (but free) polypropylene fibres 12,
7 maintaining the visibility of the overall white line
8 2.

9
10 Figure 3 shows apparatus comprising three cutting
11 discs or blades 30. The blades 30 are rotatable
12 about separate axles 32. The axles 32 are parallel
13 and offset as shown in Figure 5. The interdistance
14 of the blades 30 could be approximately 20mm apart,
15 which distance is adjustable.

16
17 The three blades 30 are generally housed within a
18 ballast frame 34. At the forward and rear ends of
19 the frame 34 are round surface rollers 36. Above
20 each blade 30 is a spool carrier 38, each having a
21 spool tensioner 44.

22
23 Each blade 30 forms a slit in the ground surface 4
24 by traversing the ground surface 4, for example by
25 being pulled by a tractor or the like through a
26 linkage. As each blade 30 is pulled, it rotates
27 about its axle 32, and so cuts through the ground
28 surface 4.

29
30 Feeding onto each blade 30 from the associated spool
31 carrier 38 and through weave tensioners 46 is a
32 folded woven polypropylene material 40 approximately

1 200mm wide, having a central woven band
2 approximately 70-80mm wide, and free weft fibres
3 extending from each side of the central band.
4 Example dimensions are 65/70/65mm of free fibres and
5 central core. The material 40 is shown
6 diagrammatically in Figure 3, but is the same as
7 that shown in Figures 1, 2a, 2b and Figure 7
8 hereinafter.

9
10 Fully woven polypropylene is used for forming bales
11 or agricultural flexible sacks and the like.

12
13
14 The folding of the combined parts of the material
15 20, 22 in Figures 2a and 2b is better seen in Figure
16 4. The folding is arranged to fit over the edge of
17 a blade 30 as hereinafter described.

18
19 As the blades 30 rotate, the folded material 40
20 follows the edge of the blade 30 and is therefore
21 fed into the ground surface 4 as the blade 30 enters
22 also. The force of the blade 30 then locates the
23 folded central woven section 10 of the material 40
24 in the slit formed, which part of the material 40
25 then remains in the ground surface 4 whilst the edge
26 of the blade 30 exits the ground surface 4. The
27 free ends 48 of the material 40, like those 20 in
28 Figures 2a and 2b, are however now visible whilst
29 being securely retained in the ground surface 4 as
30 the ground folds back around the remaining part of
31 the material and holds it in place. Over time,
32 roots and the like can grow through the part of the

1 material 22 in the ground surface 4, due to its open
2 structure, increasing its securement in the ground.

3

4 Any ground disturbance caused by the slits is rolled
5 by the rear roller 36.

6

7 In order to ensure straight lines, the apparatus or
8 apparatus-pulling means, such as the tractor, could
9 be laser guided by a laser set at the end of the
10 intended path of the line, whose beam hits a
11 receptor such as a screen on or near the apparatus
12 etc. The screen is noted by the user in use, and
13 the beam maintained within the screen, or limits set
14 on the screen, to ensure the apparatus follows a
15 straight line.

16

17 Figure 6 shows a process for forming a vented fabric
18 material as used in Figures 2a and 2b, etc wherein
19 lines of weft threads 52 are constantly run, whilst
20 only intermittent lines of warp threads 50 are run
21 thereinbetween; the line of production being towards
22 arrow C.

23

24 Once cut along the dashed line 54, two pieces of
25 vented fabric material 56 one of which is shown in
26 Figure 7, is formed. Each piece 56 is useable for
27 the method and with the apparatus hereinbefore
28 described. That is, the extended or free weft
29 threads 58 are the 'free fibres' 12, 48 shown in
30 Figures 1, 2a 2b, 3 and 4, and the woven core 60 is
31 the woven section 10, once the piece 56 is folded
32 longitudinally in half.

1

2 The present invention has been found to lay the
3 complete lines of the football pitch within a day,
4 which lines then need no further maintenance or
5 repair. Moreover, the free fibres 12,48 extending
6 above the ground surface will not trip or catch any
7 player, such as by his boots studs. Moreover, the
8 free fibres 12, 48 cannot be cut by a lawnmower such
9 that mowing any playing pitch is not a problem.

10

11 Even if the fibres 12, 48, over time, are no longer
12 upstanding, they will generally maintain a visible
13 area distinctive from the area therearound, such as
14 grass. The fibres 12, 48 are also securely held in
15 the ground surface 4, and cannot easily be pulled
16 out as the fibres 12, 48 are only connected beneath
17 the ground surface.

18

19 The present invention provides a simple but
20 effective means of providing marked lines, which
21 lines will remain, and need no further repair or
22 maintenance for a number of years, while still
23 providing the same visual effect as painted line.

1 Claims

2

3 1. A method of forming a line on a ground surface
4 comprising the steps of:
5 forming one or more slits in the ground
6 surface; inserting a line of material in the or
7 each slit such that part of the material is
8 visible above the ground surface.

9

10 2. A method as claimed in Claim 1 wherein the or
11 each slit is formed by a cylindrical blade.

12

13 3. A method as claimed in Claim 2 wherein the
14 blade has a sharpened or tapered edge.

15

16 4. A method as claimed in any one of claims 1 to 3
17 wherein the surface is wholly or substantially
18 earth.

19

20 5. A method as claimed in any one of the preceding
21 claims wherein the method comprises forming
22 between two and four slits.

23

24 6. A method as claimed in Claim 5 wherein the
25 method comprises forming three slits.

26

27 7. A method as claimed in any one of the preceding
28 claims wherein a plurality of slits are formed,
29 and the inter-distance between the slits is
30 between 10-40 mm.

31

- 1 8. A method as claimed in any one of the preceding
2 claims wherein the surface is rolled after the
3 insertion of the or each line of material.
4
- 5 9. A method as claimed in any one of the preceding
6 claims wherein that part of the material
7 visible above the ground surface comprises
8 discrete fibres.
9
- 10 10. A method as claimed in any one of the preceding
11 claims wherein the material is inserted in the
12 slit by travel on the slit-forming means.
13
- 14 11. A method as claimed in Claim 10 wherein the
15 material travels on the edge of the slit-
16 forming means towards and into the surface.
17
- 18 12. A method as claimed in Claim 11 wherein the
19 material is located in the slit by travel on
20 the slit-forming means as the slit is being
21 formed.
22
- 23 13. A method as claimed in any one of claims 10 to
24 12 wherein the material is folded over the edge
25 of the slit-forming means.
26
- 27 14. A method as claimed in claim 13 wherein the
28 material is folded equally on either side of
29 the edge of the slit-forming means along a
30 longitudinal central axis of the material.
31

- 1 15. A method of forming a line on a ground surface
2 comprising the steps of:
3 locating a slit-forming means having at least
4 one blade on the ground surface, such that a
5 portion of the blade enters the ground surface;
6 locating a fibrous or woven material on each
7 blade;
8 traversing the slit forming means along the
9 path of the intended line;
10 allowing the material to travel with each blade
11 into the ground;
12 leaving the material in each slit formed such
13 that part of the material is visible above the
14 ground surface.
15
- 16 16. A method as claimed in any one of the preceding
17 claims, wherein the method further comprises
18 forming a straight line on a ground surface
19 comprising the further steps of:
20 locating a light beam at one end of the line to
21 be formed;
22 following the path of the beam.
23
- 24 17. A method as claimed in claim 16 wherein the
25 light beam is a laser beam.
26
- 27 18. A vented fabric material suitable for use in
28 forming a line on a ground surface according to
29 the method as defined in any one of claims 1-
30 17.
31

- 1 19. A material as claimed in Claim 18 comprising a
2 woven material having a core woven section and
3 free weft fibres on each side.
4
- 5 20. A material as claimed in Claim 19 wherein that
6 part of the material which is intended to be
7 visible above the ground surface in use to form
8 the line is partially or substantially the free
9 weft fibres.
10
- 11 21. A material as claimed in any one of claims 18
12 to 20 wherein at least that part of the
13 material intended to be visible above the
14 ground surface in use is partially or
15 substantially resistant to sunlight, in
16 particular UV light.
17
- 18 22. A material as claimed in any one of claims 18
19 to 21 wherein the material is at least partly
20 open or has an open structure, through which
21 the ground under the ground surface, or
22 anything growing in the ground under the ground
23 surface, can traverse therethrough.
24
- 25 23. A material as claimed in any one of claims 18
26 to 22 wherein the material is a polymer
27 material.
28
- 29 24. A material as claimed in Claim 23 wherein the
30 material is a polypropylene.
31

- 1 25. A material as claimed in Claim 24 wherein the
2 material is polypropylene with a solid centre
3 line and weft tapes.
4
- 5 26. A material as claimed in any one of claims 18
6 to 25 wherein the material is a geotextile.
7
- 8 27. A process for forming a vented fabric material
9 as defined in any one of claims 18 to 26,
10 wherein lines of weft material are run, and
11 intermittent lines of warp fibres are run
12 thereinbetween, so as to form portions of woven
13 material and portions of weft fibre material
14 only.
15
- 16 28. A process in claimed in Claim 27 wherein the
17 so-formed material is cut across each weft
18 fibre portion to create a vented fabric
19 material as defined in any one of claims 18 to
20 26.
21
- 22 29. A line on a ground surface whenever formed by a
23 method as claimed in any one of claims 1 to 17.
24
- 25 30. A line on a ground surface whenever formed by a
26 material as claimed in any one of claims 18 to
27 26.
28
- 29 31. A line-forming apparatus, which apparatus
30 comprises one or more rotatable blades, each
31 blade being adapted to form a slit in the

1 ground surface, and adapted to feed around its
2 edge a material for partially inserting into
3 the slit.
4

5 32. Apparatus as claimed in claim 31 further
6 including a roller following the or each blade
7 along the ground surface.
8

9 33. Apparatus claimed in claim 31 or claim 32
10 wherein the apparatus comprises three offset
11 and parallel rotatable blades, each having an
12 associated material-feeding means.
13

14 34. Apparatus as claimed in any one of claims 31 to
15 33 wherein the apparatus further comprises a
16 light beam or a light beam receptor, and
17 wherein the apparatus follows the line of a
18 light beam either directly or via the receptor
19 to form a straight line.
20

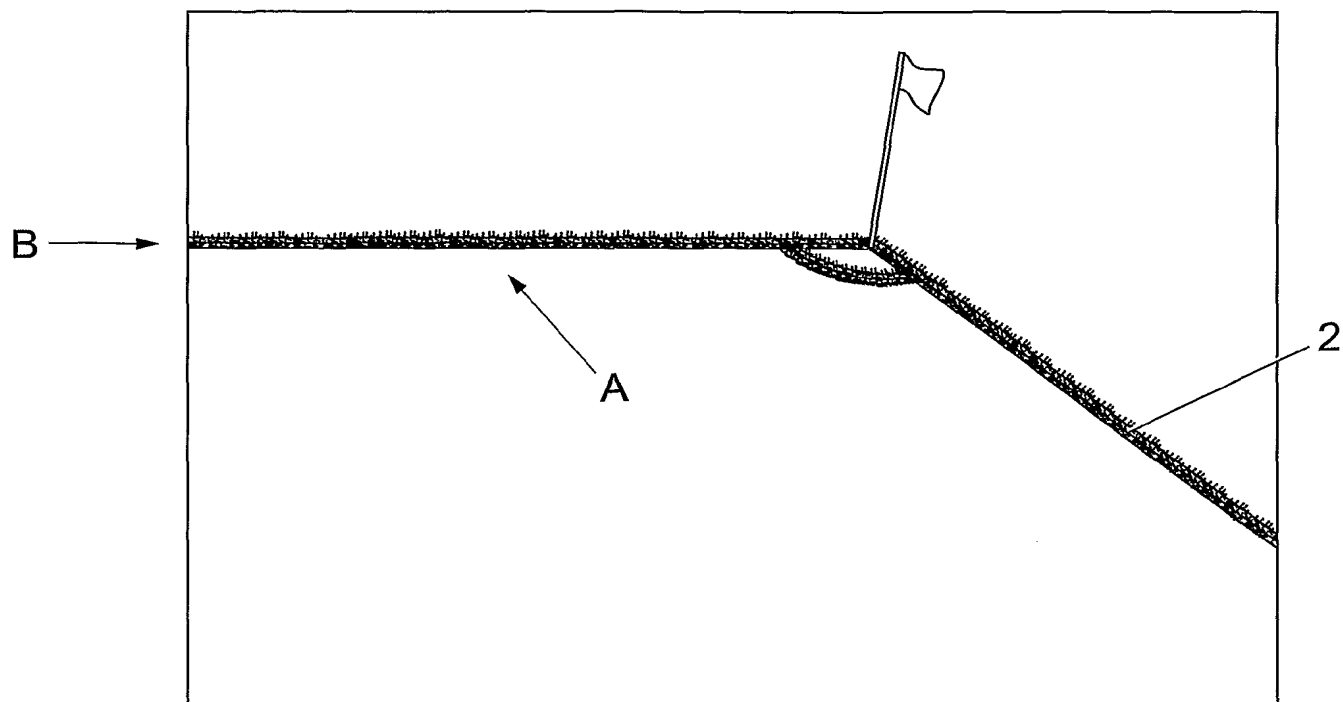


Fig. 1

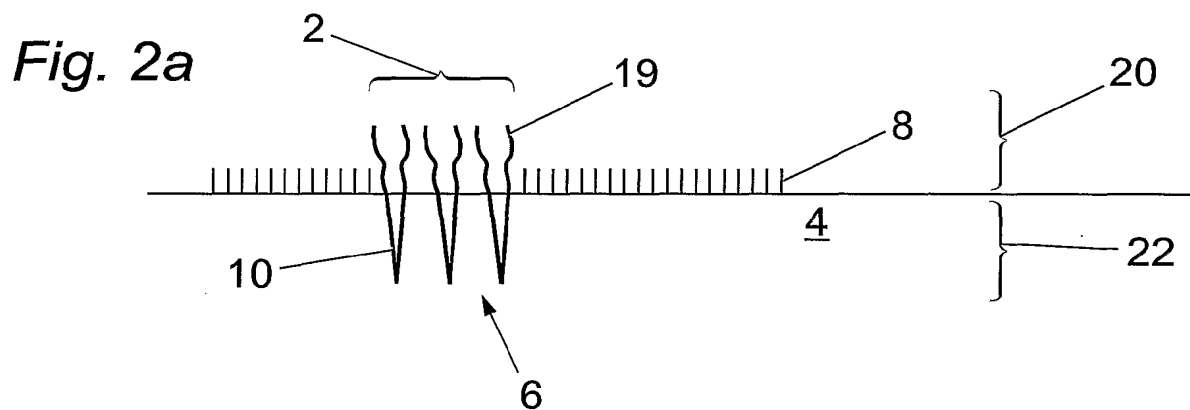
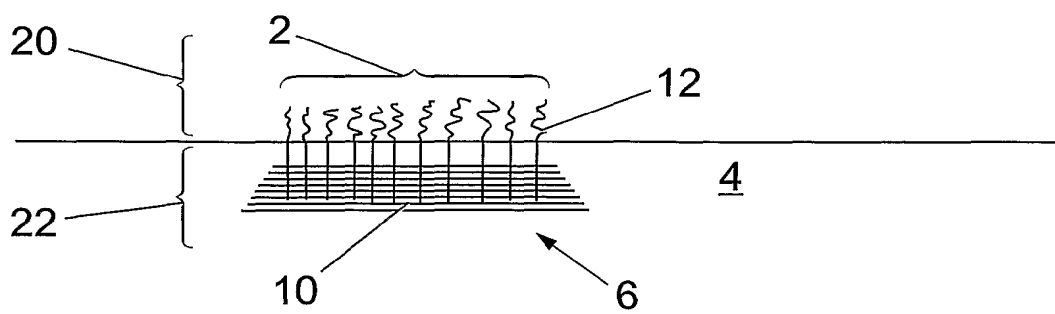
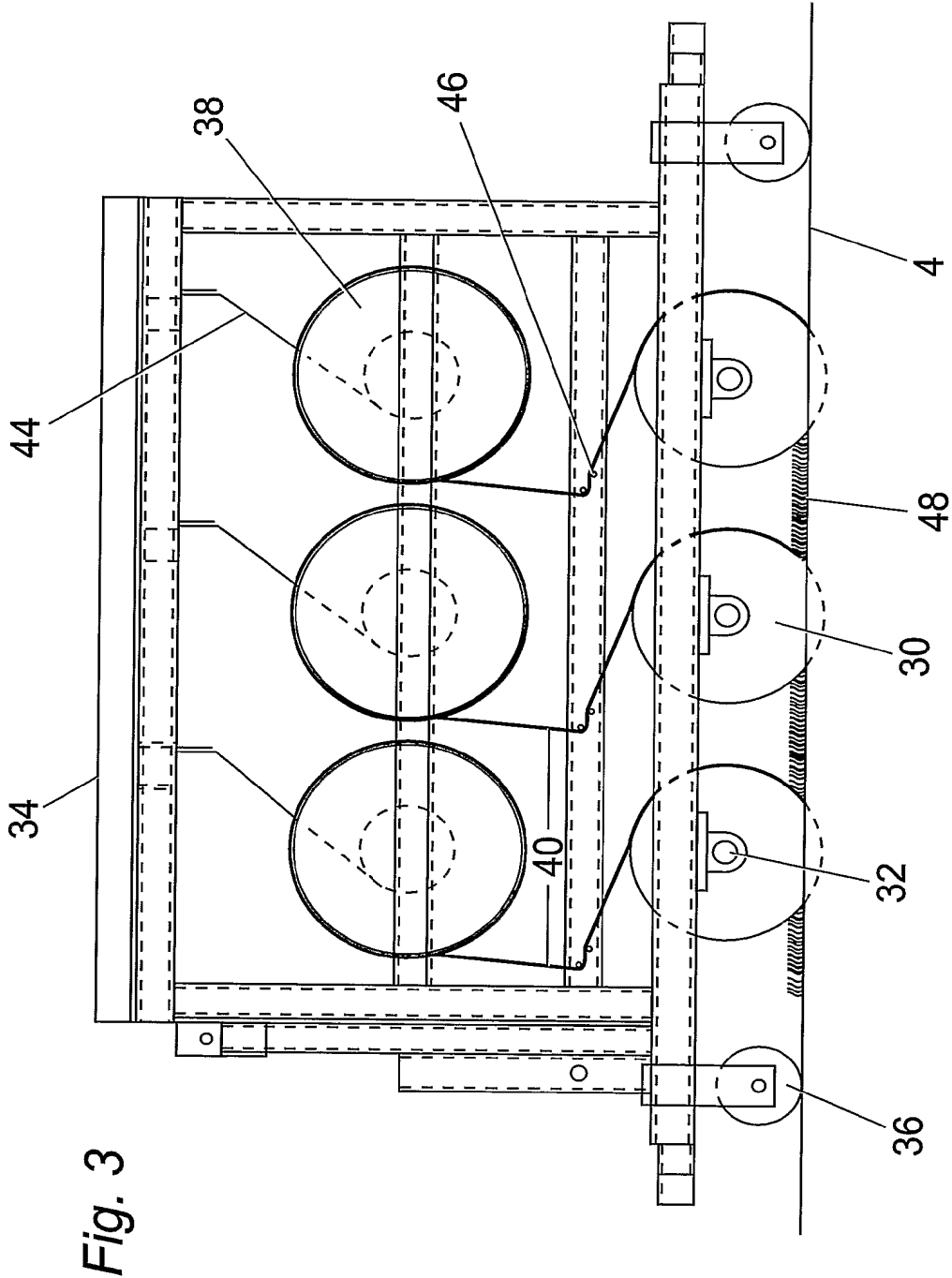
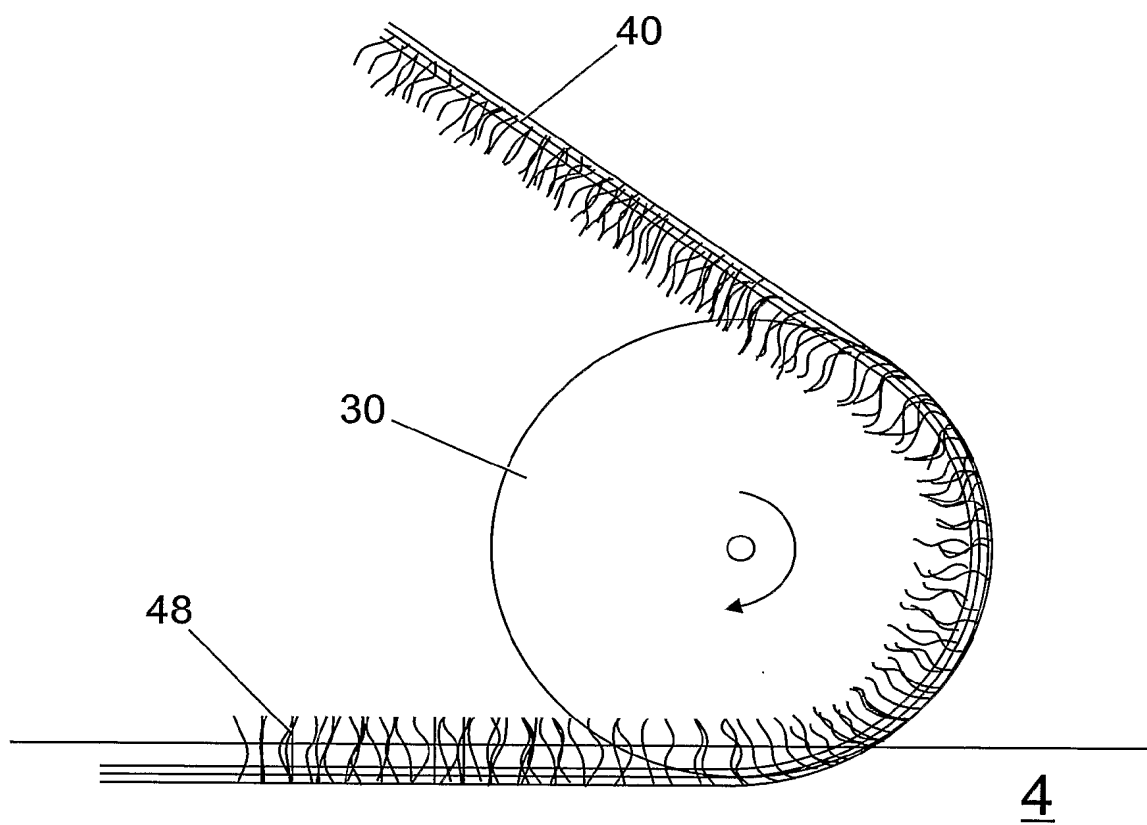
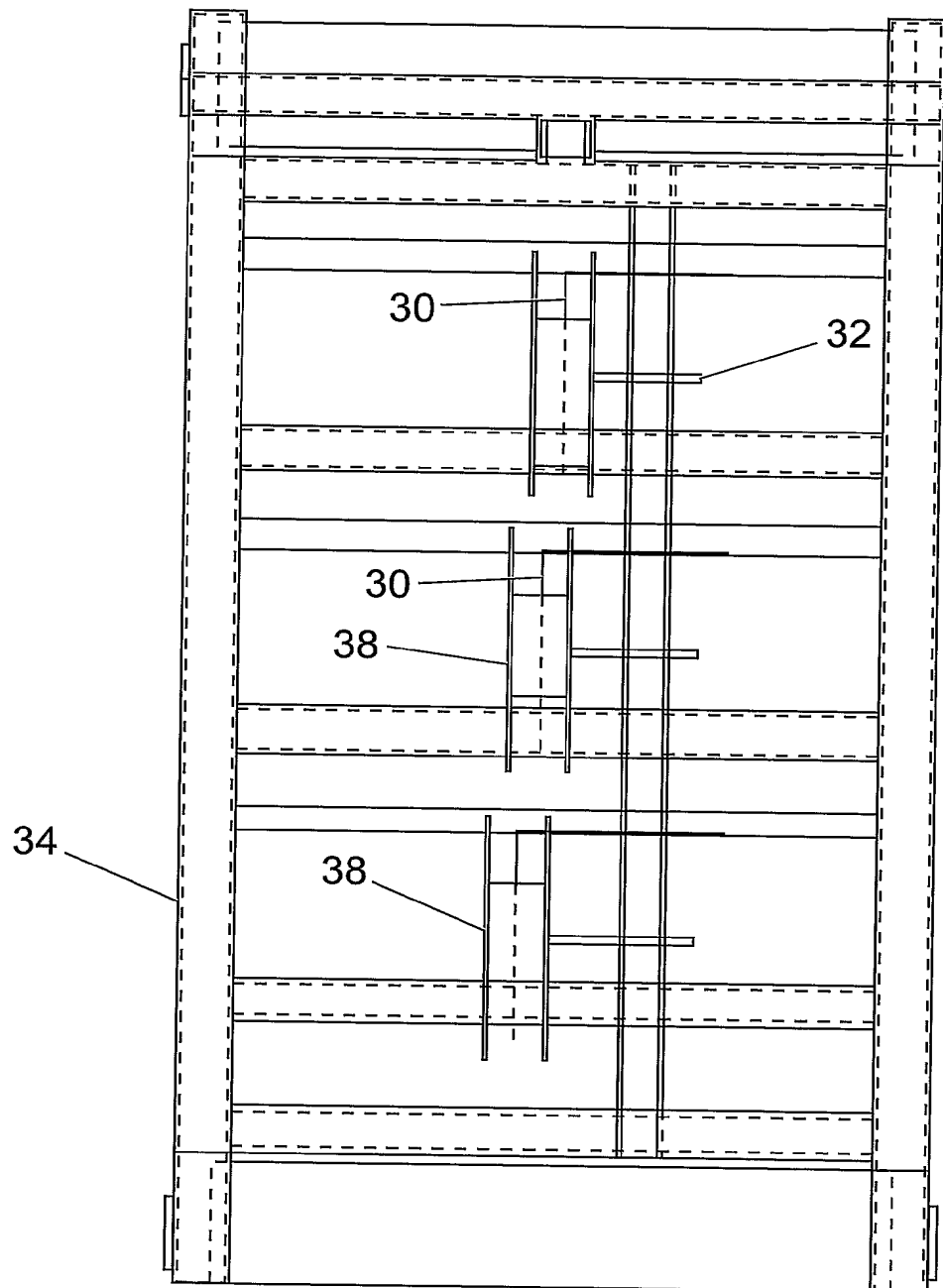


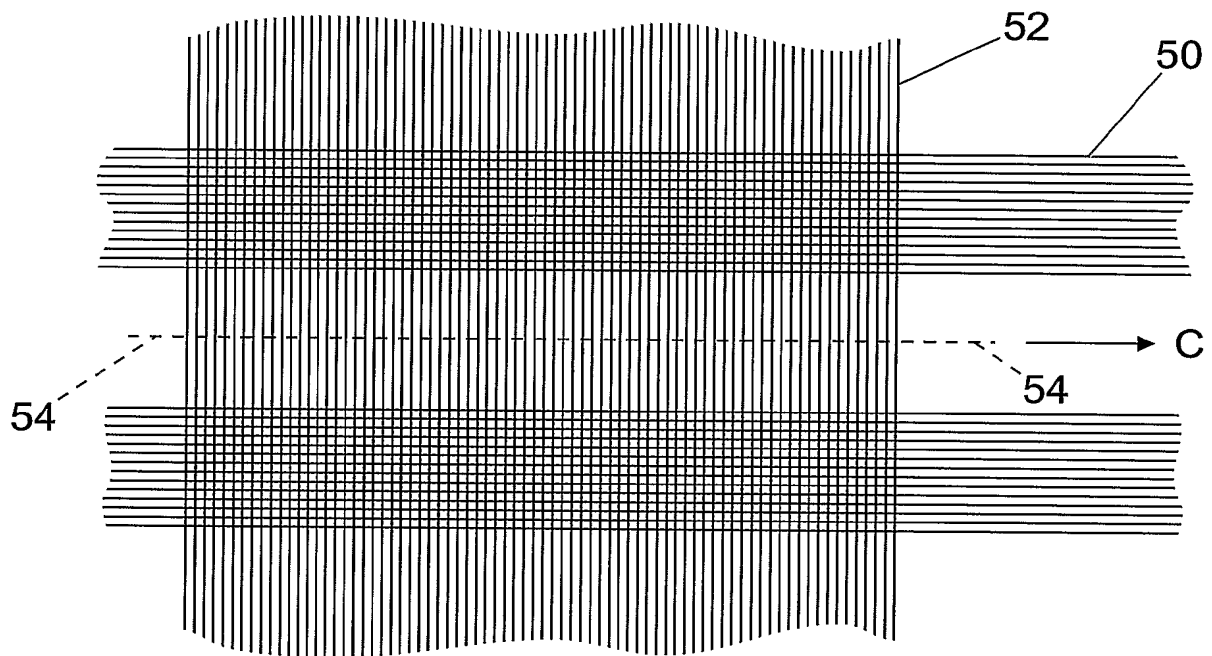
Fig. 2b

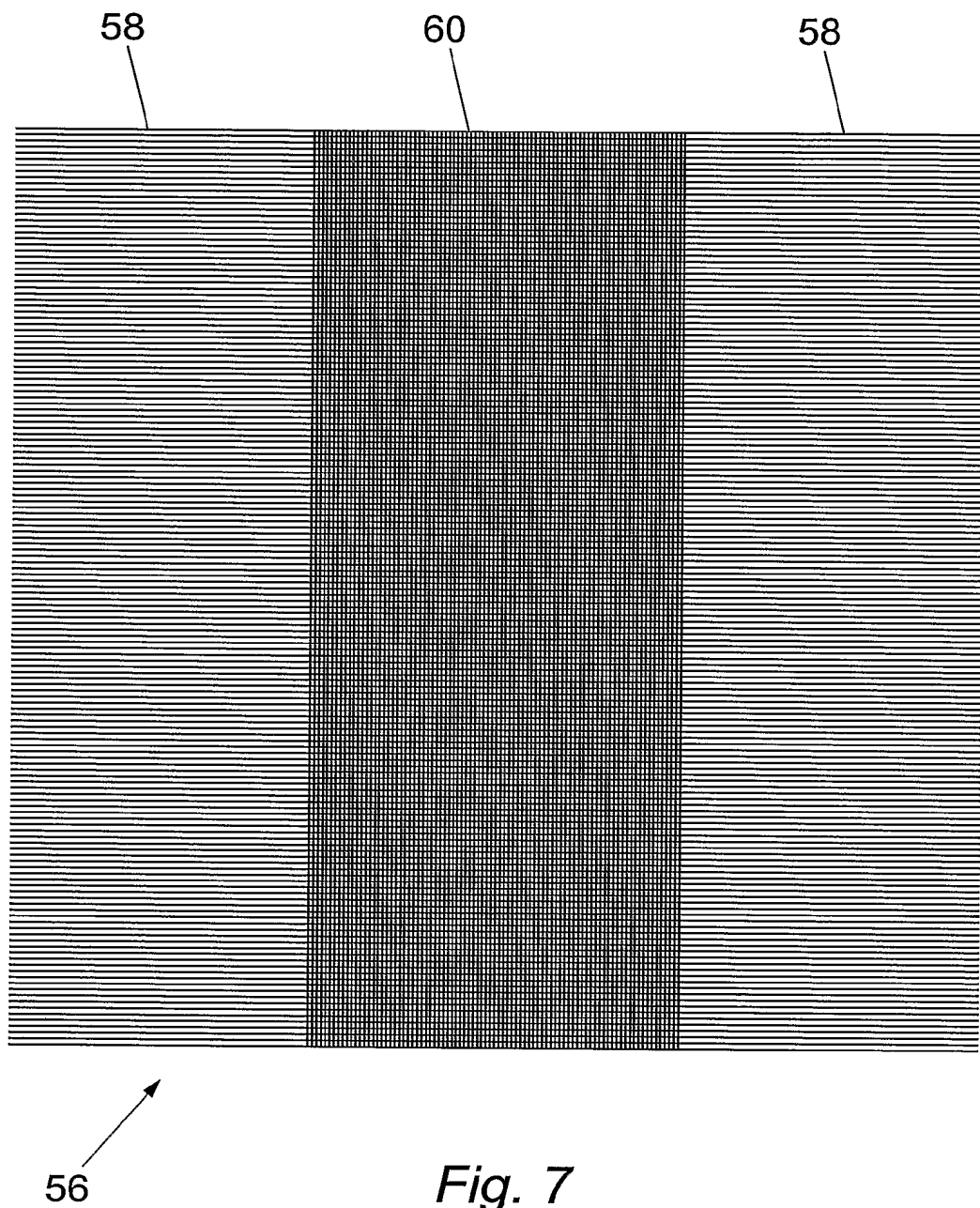




*Fig. 4*

*Fig. 5*

*Fig. 6*

*Fig. 7*

INTERNATIONAL SEARCH REPORT

International Application No

/GB2004/003806

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A63C19/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A63C E01C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 755 401 A (VON KRIES OTFRIED ET AL) 5 July 1988 (1988-07-05)	1-10
Y	column 1, line 1 - line 60 column 3, line 25 - column 4, line 25; figures 1,2	16,17
X	US 6 048 282 A (PREVOST JACQUES J ET AL) 11 April 2000 (2000-04-11)	1
	column 2, line 45 - column 3, line 5 column 3, line 66 - column 5, line 31	
X	US 4 103 886 A (ELEY CARL W) 1 August 1978 (1978-08-01)	1
	column 2, line 41 - line 60	
X	DE 35 37 650 A (KOLLER HEINRICH) 23 April 1987 (1987-04-23)	1
	column 2, line 51 - column 3, line 17	
	----- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"G" document member of the same patent family

Date of the actual completion of the international search

21 December 2004

Date of mailing of the international search report

29.04.2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Lundblad, H

INTERNATIONAL SEARCH REPORT

ational Application No

/GB2004/003806

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>WO 02/076562 A (MAYFIELD IAN ASHLEY ; EDGEROI PTY LTD (AU)) 3 October 2002 (2002-10-03) page 2, line 15 - page 3, line 5 -----</p>	16,17

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

T/GB2004/003806

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 4755401	A	05-07-1988	DE	3603386 A1	06-08-1987
US 6048282	A	11-04-2000	CA	2238953 A1	26-11-1999
			AU	745151 B2	14-03-2002
			AU	3807599 A	13-12-1999
			WO	9961705 A1	02-12-1999
			DE	69924250 D1	21-04-2005
			EP	1084303 A1	21-03-2001
			GB	2353225 A ,B	21-02-2001
US 4103886	A	01-08-1978	NONE		
DE 3537650	A	23-04-1987	DE	3537650 A1	23-04-1987
WO 02076562	A	03-10-2002	WO	02076562 A1	03-10-2002
			US	2004057795 A1	25-03-2004

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2004/003806

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

see annex

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-17,29,31-34

Problem: How to make a field line.

Solution: Form a slit in the ground and insert a material

2. claims: 18-26,27-28,30

Problem: How to make a non-impermeable material

Solution: Make a vented material
